

"Made available under NASA sponsorship  
in the interest of early and wide dis-  
semination of Earth Resources Survey  
Program information and without liability  
for any use made thereof."

Progress Report, Period Ending  
November 30, 1972  
Proposal No. SR 354  
P.I. No. UN-279  
Applicability of ERTS-1 to  
Montana Geology

Department of Geology  
University of Montana  
Missoula, MT 59801  
February 19, 1973

Contracting Officer  
Code 245, GSFC  
Greenbelt, MD 20771

Dear Sir:

Work proceeded according to the revised personnel schedule of June 22, 1972, except for the research by Johns, whose work will be distributed on a part time basis during the winter, spring and summer months. A student was hired on a part time basis to handle the cataloging and filing of ERTS data. Weidman attended the 8th International symposium on Remote Sensing of the Environment in early October.

Our bench-type light table (Richards MIM-1 series) was received October 11th and a department-furnished map file was received November 1st. First ERTS imagery was received on October 9th, followed by a steady supply of generally good quality data. During the period we were without metric camera color-infrared U-2 photographs, a zoom stereoscope, and cassettes for viewing 70mm U-2 diapositives on the optical color enhancer. Lack of the above, though not impeding overall progress, made it impossible to evaluate parts of our data analysis plan. Our inability to make satisfactory enlargements from NDPF negatives has required us to make copy negatives from 70mm diapositives, slowing our experimnts with larger scale prints and degrading the resolution of such prints.

Work performed during the reporting period included:

1. Laying of a 17-print Band 7 mosaic for the west half of Montana (regarded as a working product not suitable for distribution because of tone mismatch and conspicuous joints).
2. Construction of a coarse-scale lineament map as an overlay on the above mosaic.
3. Receipt of 70mm contact print U-2 red band mosaics for test sites 354 A-C, B, and D. (scale 1/439,000).
4. Rendition of experiemtnal false-color displays on the viewer-enhancer and demonstration of satisfactory recording on 35mm film (Ektachrome EHB).

(E73-10281) APPLICABILITY OF ERTS-1 TO  
MONTANA GEOLOGY Progress Report, period  
ending 30 Nov. 1972 (Montana Univ.) 2 p  
HC \$3.00

CSC 08G

N73-18325

Unclas

G3/13 00281

5. Experimental photogeologic annotation of 9" ERTS prints and of 18" (1/500,000 scale) enlargements made from 4x5" Plus X copy negatives.
6. Experimental enlargement of some red band 70mm U-2 negatives for photogeologic annotation.

#### Significant Results:

Rapid construction of a lineament map for western Montana, drawn as an overlay to a late August Band 7 mosaic at a scale of 1:1,000,000 indicates ERTS imagery to be very suitable for quick compilation of topographically expressed lineaments representing scarps and straight canyons. Over 100 such lineaments were detected, ranging in length from 80 down to 5 miles. Most of the major high-angle faults of the area are represented, but low-angle faults such as the Lewis overthrust are not apparent. Short and medium-length lineaments of northeast trend are abundant southeast of a line connecting Missoula and Great Falls. Only about half of the lineaments are shown on the state geologic map, and limited comparisons with more detailed maps suggest that many will merit investigation as possible faults. It is already apparent that ERTS imagery will be useful in construction of a needed tectonic map of Montana.

#### Work Planned for Next Reporting Period:

We will attempt to recognize and delineate a number of rock types occurring over large areas in sparsely vegetated terrain. Parts of the lineament map will be further checked against existing ground truth maps. 1:500,000 scale enlargements will be evaluated for recognition of folds and dip direction, and determination of the size limit of mappable folds. Completion of the data analysis review will be done upon receipt of the zoom stereoscope and metric camera color infrared U-2 photographs.

Sincerely yours,

*Robert M. Weidman*

Robert M. Weidman  
Principal Investigator

Copies to: Mr. Ed Crump, Technical Officer  
Code 430, GSFC  
Greenbelt, MD 20771

ERTS Project Scientist  
Code 650, GSFC  
Greenbelt, MD 20771

Dr. Nicholas Short  
ERTS Scientific Monitor  
Code 650, GSFC  
Greenbelt, MD 20771

✓ NASA Scientific and Technical  
Information Facility  
Attention: Earth Resources  
P.O. Box 33  
College Park, MD 20740